PERITONEAL CYTOKINE LEVELS CAN PREDICT ANASTOMOTIC LEAKAGE ON THE FIRST POSTOPERATIVE DAY

BRUCE SU1,2, TARIK SAMMOUR2, PARRY SINGH1, KAMRAN ZARGAR-SHOSHTARI1 AND ANDREW HILL1,3

1Department of Surgery, South Auckland Clinical Campus, Middlemore Hospital, The University of Auckland; 2Colorectal Unit, Department of Surgery, Royal Adelaide Hospital, Adelaide, Australia; 3Department of General Surgery, Middlemore Hospital, Counties-Manukau District Health Board, Auckland, New Zealand

Introduction: Accumulating evidence suggests that peritoneal cytokine concentrations may predict anastomotic leak after colorectal surgery, but previous studies have been underpowered. We aimed to test this hypothesis by using a larger prospectively collected data set.

Methods: This study is an analysis of prospectively collected data. This study was conducted at 3 public hospitals in Auckland, New Zealand. Patients undergoing colorectal surgery recruited as part of 3 previous randomized controlled trials were included. Data on peritoneal and plasma levels of interleukin-6, interleukin-8, interleukin-10, and tumor necrosis factor-α on day 1 after colorectal surgery were reanalyzed to evaluate their predictive value for clinically important anastomotic leak. Area under receiver operating characteristic curve analysis was performed.

Results: A total of 206 patients with complete cytokine data were included. The overall anastomotic leak rate was 8.3%. Concentration levels of peritoneal interleukin-6 and interleukin-10 on day 1 after colorectal surgery were predictive of anastomotic leak (area under receiver operating characteristic curve, 0.72 and 0.74; p = 0.006 and 0.004). Plasma cytokine levels of interleukin-6 were higher on day 1 after colorectal surgery in patients who had an anastomotic leak, but this was a poor predictor of anastomotic leak. Levels of other peritoneal and plasma cytokines were not predictive.

Conclusions: Peritoneal levels of interleukin-6 and interleukin-10 on day 1 after colorectal surgery can predict clinically important anastomotic leak.

OPTIMISING ADOPTIVE CELL THERAPY IN MELANOMA

JANE MILLS, MICHAEL KERSHAW AND DAVID GYORKI

Immune Innovation Laboratory and Department of Surgical Oncology, Peter MacCallum Cancer Centre, Melbourne, Victoria, Australia

Introduction: Adoptive Cell Therapy is a highly personalised form of cancer treatment. It involves resecting metastatic tumour deposits, culturing tumour infiltrating lymphocytes (TILs) to expand them ex-vivo and re-infusion into the patient. Another method involves genetically engineering peripheral lymphocytes to express antigen-specific receptors capable of inducing a T cell response (TCR engineering). To circumvent the need for two signals to activate a TCR, chimeric antigen receptors (CARs) can be engineered to provide their own second signal. This project aims to transduce TIL with CARs targeting Her-2 to optimise ACT and enhance anti-tumour response in melanoma.

Methods: A biopsy of resected melanoma and isolated TIL was generated and contains cell lines from 32 patients. Tumour lines were examined by flow cytometry and found to express Her2, a common tumour antigen target found on many malignancies. TILs were thawed, cultured and transduced with Her2 CAR. Matching TIL-tumour pairs were compared and examined for cytokine production using ELISA and killing capacity with chromium release assays.

Results: Melanoma TIL have been successfully transduced with Her2 CAR. Transduced TIL demonstrate production of IFNγ through both the TCR and CAR and demonstrate higher activity against HLA-matched Her2 expressing melanoma tumour lines than tumour lines that do not express Her2. Furthermore, TIL transduced with Her2 CAR demonstrate significantly higher production of IFNγ than the same TIL without transduction against HLA-matched Her2-expressing melanoma cell lines. T cells enhanced to express Her2 CAR are more efficient at killing matched tumour cells than controls.

Conclusions: These results suggest that addition of Her2 targeted CAR to TIL increases the anti-tumour efficacy of TIL. Production of TIL engineered with tumour-specific CAR may increase the efficacy of ACT in treating patients with metastatic melanoma.

A POTENTIAL MODIFIER GENE IN FAMILIAL ADENOMATOUS POLYPOSIS

MERRAN HOLMES4, KATHERINE BOLTON2, BENTE TALSETH-PALMER2, PETER POCKNEY1,5 AND RODNEY SCOTT1,2

1Hunter New England Local Health District; 2Hunter Medical Research Institute and the Discipline of Medical Genetics, School of Biomedical Science and Pharmacy, University of Newcastle; 3School of Medicine and Public Health, University of Newcastle

Introduction: Familial Adenomatous Polyposis (FAP) is a hereditary syndrome that predisposes individuals to developing hundreds to thousands of adenomatous polyps predominantly in the colon. There is an almost 100% lifetime risk that these individuals will go on to develop colorectal cancer (CRC). The development of FAP is largely due to a germline mutation in the adenomatous polyposis coli (APC) gene. In recent years, significant variability in phenotypic expression of FAP has been found in individuals carrying the same APC mutation. Ongoing research has supported the theory that this variability in phenotype may be the result of modifier genes. Identifying modifier genes in human populations has proven difficult and mouse models have been used to help identify a number of possible modifier genes. Recently, a potential candidate modifier gene was identified, CD36, with a demonstrated impact on tumorigenesis. This study aimed to investigate if single nucleotide polymorphisms (SNPs) in the CD36 gene could act as modifier genes for colon cancer development in human FAP patients.

Methods: DNA from 143 FAP patients with an APC germline mutation was obtained from the Hunter Area Pathology Service, Newcastle, NSW, and genotyped using 3 SNP assays. Polymerase chain reaction (PCR) was performed and read. Data recording extent of disease, presence of genetic mutations, age at diagnosis and intervention had been previously collated.

Results: Kaplan-Meier analysis was suggestive of a protective effect in patients carrying the homozygote variant genotype of the SNP rs1984112, with none of these patients developing CRC in the follow up period.

Conclusions: These findings are suggestive of the existence of a disease modifying variant gene which may have a significant impact on the clinical management of these patients. A larger validation cohort is currently being sought to further investigate. This method could be used to investigate other potential modifier genes.

DONOR-SPECIFIC CELL-FREE DNA AS A NON-INVASIVE MARKER OF ORGAN REJECTION AFTER LIVER TRANSPLANTATION: A PILOT STUDY

SU KAI GOH, HONGDO DO, VIYARAGAVAN MALIKSHARAN, ALEXANDER DOROVIC AND CHRISTOPHER CHRISTOPH

Department of Surgery, University of Melbourne, Austin Health Translational Genomics and Epigenomics Laboratory, Olivia Newton-John Cancer Research Institute

Introduction: Up to 30% of patients will develop an episode of rejection in the first year after liver transplantation. Conventional means to diagnose organ rejection are either inaccurate or highly invasive. Hence, better biomarkers for the non-invasive diagnosis of organ rejection are needed. Recent studies have proposed the use of donor-specific circulating cell-free DNA (dscfDNA) as a non-invasive marker of organ rejection. Unlike current methodologies adopted to evaluate dscfDNA, we have developed a rapid digital PCR methodology to accurately measure dscfDNA levels.

Methods: Eight patients who underwent liver transplantation were prospectively recruited. Genotyping of a set of deletion/insertion polymorphisms was performed to identify donor-specific alleles. Droplet digital PCR was then utilized for the serial quantification of dscfDNA in the circulation of the recipient. DscfDNA levels were measured in pre-transplant and post-transplant bloods for each recipient at days 3, 7, 14, 28 and 42.

Results: DscfDNA levels were reflective of organ health. In six recipients who underwent uneventful transplantation, levels of dscfDNA markedly reduced at day 3 and rapidly plateaued to a very low level from day
7 onwards. We also found that dscfDNA levels were independent of cholestasis in a separate recipient. On the other hand, dscfDNA levels were markedly elevated in a patient who developed an episode of organ rejection.

Conclusions: In this pilot study, we demonstrated the robustness of our methodology for the detection and quantification of dscfDNA. Our methodology was readily-performed and results were attainable in 5.5 hours. Larger validation studies are required to confirm the diagnostic performance and clinical utility of dscfDNA, especially in the setting of other common post-transplant complications.

THE IMMUNE INFILTRATE IN ANAL SCC: PREDICTION AND PRECLINICAL MODELS

GLEN R. GUERRA, JOSEPH C. KONG, ROSEMARY M. MILLEN, DAVID S. LIU, SARA ROTH, ALEXANDER G. HERIOT, ROBERT G. RAMSAY AND WAYNE A. PHILLIPS

Department of Cancer Research, Sir Peter MacCallum Cancer Centre, Division of Surgery, Department of Oncology, Sir Peter MacCallum Cancer Centre

Background: Anal squamous cell carcinoma represents a relatively small proportion of lower gastrointestinal tumours. However, the incidence has more than doubled over the last four decades without an improvement in survival due to a lack of advancement in treatment options. While definitive chemoradiotherapy achieves a good outcome for many patients, a significant number suffer from persistent, relapsed or metastatic disease. Other than salvage surgery, there are at present no effective treatment options for this cohort who face a dismal prognosis.

Objective: To determine the predictive power of the immune infiltrate in anal SCC and establish preclinical models to elucidate the effectiveness of immunotherapy as a new modality of treatment.

Methods: Immunohistochemistry (IHC) and flow cytometry is being performed on a cohort of anal SCC patient specimens to examine the immune infiltrate for correlation with patient outcomes. In parallel, in vitro and in vivo preclinical anal SCC models have been established to enable the effectiveness of immunotherapies to be examined.

Results: A pilot study examining the density of CD8+ immune cells in a cohort of 20 anal SCC patients has been undertaken. This has identified that 64% of patients (9/14) in the complete response cohort had a high TIL infiltrate compared with 0% (0/6) in the locoregional recurrence group, demonstrating a trend towards higher CD8 density correlating with disease-free survival.

A human anal SCC explant in vitro model has been developed, which in conjunction with matched tumour infiltrating lymphocytes recreates the tumour-immune microenvironment to determine the modulatory effect of immunotherapy. A syngeneic mouse model of anal SCC has also been developed to act as an in vivo platform to examine the effect of immunotherapies.

Conclusions: The preliminary findings hold significant promise that the immune infiltrate of anal SCC may be useful as a predictor of patient response. The establishment of immunotherapy relevant in vitro and in vivo models will allow the first preclinical testing of immunotherapy in anal SCC. This research program will hopefully enhance the treatment options available to anal SCC patients, particularly for those with relapsed and metastatic disease.

DEVELOPING AN ORGANOID IMMUNE ASSAY FOR IMMUNOTHERAPY

JOSEPH C. KONG1,2,3,4, GLEN R. GUERRA1,2,3,4, ROSEMARY M. MILLEN3,4, SARA ROTH1, SHIREN SAMPURNO1, WAYNE PHILLIPS1,3,4, ROBERT G. RAMSAY2,3,4 AND ALEXANDER G. HERIOT4

1Division of Cancer Surgery; 2Differentiation and Transcription Laboratory; 3Surgical Oncology Laboratory; 4University of Melbourne, Peter MacCallum Cancer Centre, Melbourne, Victoria, Australia

Background: Current treatment algorithm for rectal cancer is neoadjuvant chemoradiotherapy followed by radical surgery. However, 20-30% of patients do not respond to chemoradiotherapy, with no other therapeutic option left to increase tumour response rate. Promising emerging therapies employing immunotherapy by check-point inhibition and/or targeted-vaccine are now highly relevant. In view of the enthusiasm for immunotherapy, we recognise a gap in the capacity to explore these therapies, in particular utilising human primary cancer.

Therefore the aim is to develop a novel immune cytotoxic assay using a human patient-derived pre-clinical model to gain a better understanding of the biological efficacy of immunotherapy in neoadjuvant treatment of rectal cancer.

Methods: This is a prospective observational study. Fresh rectal cancer biopsies were processed to generate rectal cancer organoids and tumour-derived T infiltrating lymphocytes (TILs). TILs were Fluorescence-activated Cell Sorting (FACS) to determine the proportion of cytotoxic T cell. These are then co-cultured for 24 hours and organoid death is measured by fluorescence microscopy (Axiovert) using an apoptotic marker Caspase 3/7.

Results: Six patients were recruited for this pilot study. An effector (TILs) to target (organoid) ratio of 10:1 showed complete organoid death in 12 hours, whereas a ratio of 1:1 appear to take up to 24 hours. Assays were extended for up to 5 days and irrespective of the effector to target ratio, a small proportion of organoids continue to survive.

Conclusion: As a proof of concept, I have established that matched patient-derived TILs are capable of killing rectal cancer organoid cultures from the same patient tumour. The next step is to validate more extensively TIL function, organoid death and how to harness this model as a tool for high-throughput therapy screening.

NOVEL METASTATIC MODELS OF HUMAN ESOPHAGEAL ADENOCARCINOMA HIGHLIGHT THE IMPORTANCE OF E-CADHERIN IN CANCER METASTASIS

DAVID LIU, SANNE J.M. Hoenagle, OLIVER M. FISHER, KAUSILIA K. KRISHNADATH, KAREN G. MONTGOMERY, RITA A. BUSUTTIL, ANDREW J. COLBEATCH, MATTHEW READ, CUONG P. DUONG, WAYNE A. PHILLIPS AND NICHOLAS J. CLEMONS

Division of Cancer Research, Peter MacCallum Cancer Centre

Introduction: Metastatic esophageal cancer has a poor prognosis with limited treatment options. The pathogenesis of this disease is poorly understood despite the high incidence of metachronous and de novo metastasis. This is partly due to the paucity of preclinical models available to study this disease process.

Methods and Results: Here we report that FLO-1, and derivation of its isogenic companion FLO-1LM, as two spontaneously metastatic cell line models of human esophageal adenocarcinoma (EAC). We show that FLO-1 has undergone epithelial-mesenchymal transition and metastasizes following subcutaneous injection in mice. FLO-1LM, derived from a FLO-1 liver metastasis, has markedly enhanced proliferative, clonogenic, anti-apoptotic, invasive, immune-tolerant and metastatic potential. Importantly, genome-wide RNAseq profiling revealed significant enrichment of metastasis-related pathways in FLO-1LM cells, many of which are also evident in patient samples. Moreover, CDH1, which encodes the adhesion molecule E-cadherin, was the most significantly downregulated gene in FLO-1LM compared to FLO-1. Consistent with this, repressed E-cadherin expression, which is commonly reported in EAC, is functionally associated with increased FLO-1 metastasis and independently predicts poor patient survival.

Conclusions: Collectively, these findings highlight the biological importance of E-cadherin activity in the pathogenesis of metastatic EAC, and validate the utility of FLO-1 parental and FLO-1LM cells as preclinical models of metastasis in this disease.

THE USE OF POSITRON EMISSION TOMOGRAPHY IN THE DIAGNOSIS OF COLORECTAL CANCER: A SINGLE CENTRE STUDY

DORUK SEYFI, CHATIKA PREMARATNE, CHUONG BUI AND WALID BARTO

Department of Colorectal Surgery, Nepean Hospital Department of Nuclear Medicine, Nepean Hospital

Introduction: Colonoscopy is the gold standard in the evaluation of colorectal cancer (CRC). However, colonoscopy remains an invasive diagnostic tool requiring anaesthesia with a 1:1000 perforation risk. Positron emission tomography is established in staging of many malignancies. Integration with computed tomography (PET/CT) allows for metabolic evaluation of tissue with anatomical mapping. The diagnostic role of PET/CT has

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been recently considered since incidental colonic uptake has been documented. Our study hypothesis is that PET/CT is a sensitive/specific diagnostic tool in patients with CRC.

**Methods:** Ethics approval was obtained. PowerChart and ProVation programs were used to obtain reports from PET/CTs, colonoscopies and histopathology. Inclusion criteria: adults >18 years of age, patients who have undergone PET/CT of any kind within 6 months of colonoscopy and patients who have undergone colonoscopy within 6 months of any PET/CT. This was to assess patients with incidental uptake as well as metabolic characteristics of lesions. Patients were excluded if they were actively receiving therapy for malignancy or if the diagnostic studies were >6 months apart.

**Results:** Data was collected retrospectively for a 12-month period. 261 patients had colonoscopy and PET/CT within 6 months. 206 were excluded for previous treatment. The remaining 55 patients’ data were used for analysis. Reports for both colonoscopy and PET/CT were obtained with histopathological correlation. These results were cross-referenced to assess for true positive/negative and false positive/negative findings. This allowed derivation of sensitivity/specificity and an odds ratio to determine the likelihood PET/CT would demonstrate CRC. The dataset was adjusted for age and gender. The sensitivity and specificity of colonoscopy in the detection of CRC is 89% (95% CI: 66.86-98.70) and 46% (95% CI: 19.22-74.87) respectively. The sensitivity and specificity of PET/CT in the detection of CRC is 96% (95% CI: 78.88-99.89) and 50% (95% CI: 15.70-84.30) respectively. Patients who had a colorectal PET/CT were 10 times more likely to have a positive PET/CT (OR: 10.95; 95% CI: 1.16-96.69; p = 0.04) and 5 times more likely to have a positive colonoscopy (OR 5: 95% CI: 1.09-23.44; p = 0.04).

**Conclusion:** PET/CT is a sensitive and specific modality for the diagnosis of CRC when compared with colonoscopy. It is non-invasive and becoming increasingly available.

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**COLD IN SITU PERFUSION PRIOR TO LIVER AND PANCREAS PROCUREMENT FOR TRANSPLANTATION – A SYSTEMATIC REVIEW AND META-ANALYSIS**

*AHMER HAMMED1,2,3, HENRY C. PLEASE3,4, AND WAYNE J. HAWTHORNE1,2,3*

1Centre for Transplant and Renal Research, Westmead Institute for Medical Research; 2Department of Surgery, Westmead Hospital, Westmead; 3Sydney Medical School, University of Sydney, Sydney; 4Department of Surgery, Royal Prince Alfred Hospital, Camperdown, NSW, Australia

**Introduction:** In order to increase the potential usable organs from multi-organ donors various means of improving outcomes are being investigated. One particular focus is on how best to improve donor in situ cold perfusion. However, there is considerable discrepancy in the literature and guidelines regarding the ideal perfusion route, volume and solution(s) for deceased donor liver and pancreas procurement, including for islet cell isolation.

**Methods:** Eligible studies were identified from the Embase, Medline and Cochrane databases (1980 to current). Meta-analyses were conducted for comparisons between dual and aortic perfusion, and to analyse the efficacy of histidine-tryptophan-ketoglutarate (HTK) and/or Celsior as alternatives to University of Wisconsin (UW) solution. Semi-quantitative analyses were conducted for graft survival, operative complications and islet function, stratified by perfusion fluid and techniques.

**Results:** Forty-four articles and 19 article subsets were included in qualitative comparisons and meta-analyses, respectively, encompassing 959 pancreatic transplants, 105 islet cell isolations, and 3 562 liver transplants. Aortic in situ pancreas perfusion with HTK compared to UW resulted in a higher peak lipase (standardized mean difference [SMD] 0.47, 95% CI 0.23-0.71; p < 0.001) and graft pancreatitis rate (risk ratio [RR] 2.16, 95% CI 1.29-3.60; p = 0.003). Initial graft function, biochemical parameters, thrombotic graft loss rates and biliary complications in hepatic allografts were no different for livers perfused/preserved with UW, HTK or Celsior. Using semi-quantitative analyses, UW compared to HTK aortic perfusion yielded median one-year pancreas graft survivals of 90% and 81%, respectively. The corresponding survivals for dual-perfused livers were 83%, 80%, and 93% for UW, HTK and Celsior, respectively. Dual perfusion was not superior to aortic-only liver perfusion with respect to graft survival, biliary complications or graft function.

**Conclusions:** UW aortic-perfusion is clearly superior to HTK perfusion in terms of short-term whole-organ pancreas graft outcomes, whilst longer-term and islet isolation results are less clear requiring larger cohort studies or trials. There is no significant difference between UW, HTK or Celsior for liver perfusion and preservation. Dual perfusion does not provide benefits over aortic-only flushing for liver procurement.

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**EFFECT OF TRANS- VERSUS EXTRAPERITONEAL COLOSTOMY ON PARASTOMAL HERNIA RATES FOLLOWING ABDOMINOPERINEAL RESECTION**

*REBEKAH JAUNG1, JENNY YOON1, MARC H. SCHREINEMACHER1, JOS PEETERS3, ALAN O’GRADY4, AND IAN P. BISSETTE1,5*

1Department of Surgery, The University of New South Wales, Australia; 2Department of Surgery, Academic Medical Centre, Amsterdam; 3Maastricht University, The Netherlands; 4Department of Radiology, Auckland City Hospital; 5Department of Surgery, Auckland City Hospital, New Zealand

**Introduction:** Parastomal hernia is a relatively common complication following abdominoperineal resection (APR) and up to a third of affected patients require corrective surgical treatment. The purpose of this study was to compare the occurrence of parastomal hernia in association with extraperitoneal and transperitoneal stomas following an APR.

**Methods:** All patients who had an elective APR for cancer at Auckland City Hospital between 1989 to 2015 were included. Presence of parastomal hernia was determined by ultrasound or review of CT scans. Post-operative complications were graded according to the Clavien-Dindo classification.

**Results:** Of 126 screened patients, 76 patients were included. Forty-six had a transperitoneal and thirty had extraperitoneal stomes. The groups had a similar distribution of age, gender and body mass index. Follow-up was longer in the transperitoneal group (69.12 versus 46.3 months, p = 0.01) but there was no difference in follow-up time between patients with and without hernias. Total time spent in theatre was longer for extraperitoneal colostomy (322 versus 245 minutes, p = 0.044). There were significantly more parastomal hernias in the transperitoneal group (20 versus 5, p = 0.014). BMI was significantly higher in those who developed para-stomal hernia (29 kg/m² versus 24 kg/m², p = 0.05). Serious (Clavien-Dindo ≥3a) post-operative complications occurred at a higher rate in the extraperitoneal group (p = 0.016), but only three involved the stoma.

**Conclusion:** Parastomal hernias occurred more frequently in patients who underwent transperitoneal colostomy during APR. Although the extraperitoneal group had more Clavien-Dindo ≥3a post-operative complications, most events were not stoma-related.

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**PATIENT DERIVED METASTATIC PROSTATE CANCER DEPOSITS FOR THE DEVELOPMENT OF ACTIONABLE PERSONALISED CELL LINES**

*ANDREW JOSHI1,2, CHERYL NICHOLSON1,2, ALEXANDER HUTCHINSON1, STEPHEN MCPHERSON1, HANDOO RIMZ1,2, JENNIFER GUNTER1, ELIZABETH WILLIAM1, COLLEEN NELSON1 AND IAN VILLA1*

1Australian Prostate Cancer Research Centre – Queensland, Institute of Health and Biomedical Innovation, Queensland University of Technology, Princess Alexandra Hospital, Translational Research Institute; 2Department of Urology, Princess Alexandra Hospital, Brisbane, QLD, Australia

**Introduction & Objectives:** Prostate cancer is difficult to culture in vitro, as demonstrated by the limited number of cell lines readily available. This has hindered the progress in understanding tumour pathogenesis and the therapeutic response of prostate cancer. Alternative models such as Patient Derived Xenografts (PDxXs) are expensive and limited by their inability to manipulate cells genetically. Recent development of novel organoid in vitro culture technology has led to the development of multiple new in vitro prostate cancer cell line models. We aim to apply this new culture technology in order to develop novel in vitro prostate cancer cell line models and propagate patient derived samples to allow drug testing and next generation sequencing as part of a precision medicine approach to prostate cancer.

**Methods:** Patient derived metastatic tissue samples were collected as part of a larger clinical trial. These were digested in Type II Collagenase (Gibco) for 2 hours and seeded directly onto Collagen Type I coated plates in Prostate Culture Media. Samples were cultured in vitro for a minimum of 2 weeks prior to validation methods. PSA ELSA (GenWay Biotech) of
conditioned media along with RT-qPCR comparison of various gene products of interest between cultured patient samples and established prostate cancer cell lines was performed. In vitro samples were subsequently utilised for therapeutic screening.

Results: A total of 5 patient samples were available for culture with histologically proven metastatic prostate cancer. Tissue from a 67 year old male with biochemical recurrence of prostate cancer was successfully cultured for validation after 4 weeks. PSA ELISA of conditioned media was positive, with a value up to 30 ng/ml. RT-qPCR confirmed expression of Prostate specific genes PSA, AR, FKBP5 and TMPRSS. Next generation sequencing and in vitro therapeutic screening of generated cultures is ongoing.

Conclusions: We have been able to successfully culture patient derived prostate cancer samples using novel organoid in vitro culture technology. This suggests the potential role of using patient derived biopsy samples as part of a precision medicine approach to prostate cancer. Organoid in vitro culture technology could provide a vital stepping stone towards precision medicine in the future, involving the rapid generation of in vitro models from a patient to allow therapeutic screening to guide treatment for an individual patient.

YTTRIUM-90 RADIOEMBOLIZATION FOR UNRESECTABLE INTRAHEPATIC CHOLANGIOCARCINOMA: A SYSTEMATIC REVIEW AND POOLED ANALYSIS

DANIEL YANG, WINY WIDJAJA, VINCENT LAM AND SIMON SO
Department of Upper Gastrointestinal and Hepatobiliary Surgery, Westmead Hospital; Department of Interventional Radiology, Westmead Hospital

Introduction: Intrahepatic cholangiocarcinoma (ICC) is the malignant transformation of cholangiocytes within the hepatic bile ducts, and represents the second most common malignant primary liver tumour. Surgical resection is the only potentially curative treatment, however, ICCs are often latent in its early stages and therefore demonstrate low resectability rates by the time of diagnosis. Yttrium-90 microsphere radioembolization treatment has been increasingly reported as an alternative treatment option for unresectable ICC. The goal of this study is to systematically review the current literature on the treatment of unresectable ICCs with yttrium-90 radioembolization and explore the effectiveness of this treatment modality.

Methods: A comprehensive literature search of electronic databases was conducted on MEDLINE, EMBASE, SCOPUS and the Cochrane Library. Inclusion and exclusion criteria were applied. The primary outcomes compared were overall survival and radiological tumour response to yttrium-90 radioembolization.

Results: A total of 20 studies published between October 2009 and June 2016 were included for review. These were a combination of retrospective and prospective cohort studies. 542 total patients were included in the analysis, with the largest study containing 68 patients, while the smallest had only 9. Median overall survival ranged from 7 months to 22 months across the 20 studies. Analysis based on pooled data demonstrated a mean overall survival of 13.44 months and a weighted median overall survival of 11.5 months. Of the 20 included studies, 10 provided date on tumour response, determined by radiological studies. These responses were categorized according to either RECIST, modified RECIST, PERCIST or EASL criteria. Following pooled analysis, complete response was seen in 2% of patients, partial response in 29%, stable disease in 37.5% and disease progression in 18.75%. Only 1 reported case of down staging to section following partial response was identified.

Conclusion: Yttrium-90 radioembolization may be an effective therapy that offers survival benefits in cases of unresectable ICC. While early data suggests yttrium-90 radioembolization offers survival outcomes comparable to systemic chemotherapy and other intra-arterial therapies, further randomized clinical trials are required to address the need for standardized optimal treatment of unresectable ICCs.

GEOSPATIAL VARIABILITY OF BREAST CANCER ACCORDING TO AGE: THE ROYAL PRINCE ALFRED EXPERIENCE

PIKLI BATABYAL1,2, DAVID GOLTSMAN1,2, ELEANOR BRUCE2,3 AND SANJAY WARRIER1

1Department of Surgery, Royal Prince Alfred Hospital; 2University of Sydney, Camperdown; 3Geocoastal Research Group, School of Geosciences, Madsen Building F09, University of Sydney, NSW 2006, Australia

Introduction: Breast cancer was the most common cancer in Australian women in 2016. The primary risk factor is age. The incidence of breast cancer rises with age until approximately 50 years, then plateau and declines by 80 years. Australian data in 2013 showed 22.8% of new breast cancers occurred in women ≥50 years; 51.6% in women 50–69 years; and 25.5% in women aged ≥70 years.

Few studies have assessed the geographic variability of age-based cancer risk within local hospital catchment areas. Hence, this preliminary study attempts to apply a spatial approach to categorise the frequency of breast cancer based on age of diagnosis and location of residence within the Sydney Local Health District (SLHD). The results from this study aim to design targeted prevention campaigns for different population demographics, improve screening and encourage the development of local health policy.

Methods: All patients presenting to RPAH with late stage breast cancer (Stage III/IV) between July 2005–March 2013 were retrospectively identified. Information regarding patient demographics, breast cancer detail and clinical outcomes were collected. Patients were stratified according to age groups that reflect current breast screening practice in Australia: <40 years, 40–49, 50–69, and ≥70. Spatial analysis was used to determine geographic variability in the relative-risk of breast cancer occurrence by postcode in the SLHD. Data was cross-correlated with the SEIFA summary measure (Socioeconomic Indexes for Areas). Choropleth maps were generated per index.

Results: A total of 5317 patients presented to RPAH with late stage breast cancer over the study period. 7.27% (n = 388) of patients were <40 years; 21.33% (n = 1138) were 40–49; 56.64% (n = 3021) were 50–69; and 14.75% (n = 787) were ≥70. For the <40 age group, higher relative-risk occurs in eastern SLHD; 40–49 higher relative-risk occurs in the eastern and southeastern regions; 50–69 years higher relative-risk occurs in the eastern, northeastern and central regions and for ≥70 higher relative-risk occurs in the east-central region.

Conclusions: This novel method of geospatial analysis shows discrepancies in breast cancer risk by age, indicating that breast cancer can be more effectively targeted in the SLHD. Given Australia’s ageing population and high proportion of females, this topic represents a pertinent epidemiological focus for expansion from a pilot study to nationwide mapping.

DO EXPERTS PRACTICE WHAT THEY PREACH? A STUDY OF VARIABILITY IN EXPERT PERFORMANCE OF TEMPORAL BONE SURGERY

JUN ZHOU, SUDETHU WIJEWICKREMA, IOANNA IOANNOU, BRIDGET COPSON AND STEPHEN O’LEARY
Department of Otolaryngology, University of Melbourne

Introduction: Virtual reality (VR) simulation has gained popularity as a supplement to traditional methods of surgical training. Along with providing a risk-free environment for practice, using VR allows the collection of performance metrics which can be used to develop performance goals. In previous studies comparing registrars and expert surgeons, it has been shown that skill level can be predicted by assessing surgical technique and decision quality. No previous study has investigated the variability in areas drilled between expert surgeons, for example the completeness of anatomical exposure of landmarks and the approach to critical regions.

Objective: We investigate the variation of drilled regions of expert and trainee surgeons performing virtual temporal bone surgery to identify their compliance with standard drilling procedures.

Methods: The study participants were seven expert and six trainee ENT surgeons, who were asked to perform the surgical preparations for cochlear implantation on a virtual temporal bone. The temporal bone was divided into six regions using a semi-automated approach. The drilled area in each region was calculated as a ratio of voxels (3D points) drilled by at least 75% of surgeons and at least 25% of surgeons.

Results: The sign test showed that there was a significant difference between groups when performing critical tasks such as drilling in the regions of the facial nerve (p < 0.001), the facial recess (p < 0.001), and the round window (p < 0.001). In these regions, experts practice more similar performance compared to other compared regions.

Conclusion: The results indicate that expertise in temporal bone surgery is related to the areas drilled. Experts perform similarly in critical parts of the procedure, following standard guidelines, and do indeed practice what they preach. With regards to surgical education and performance
DEFINING LOW ANTERIOR RESECTION SYNDROME: A SYSTEMATIC REVIEW OF THE LITERATURE

Celia Keane1, Cameron Wells1, Greg O’Grady1 and Ian Bissetti1,2

1Department of Surgery, University of Auckland; 2Department of Surgery, Auckland City Hospital, Auckland, New Zealand

Background: There is increasing awareness of the poor functional outcome many patients suffer after sphincter-preserving rectal resection, termed ‘low anterior resection syndrome’ (LARS). There is no consensus definition of LARS and varying instruments have been employed to measure functional outcome, complicating research into incidence, contributing factors, and potential therapies.

Aim: To describe the instruments and outcome measures used in studies of post-low anterior resection bowel dysfunction and identify major themes used in the assessment of LARS.

Methods: A systematic review of the literature was performed for studies published between 1986 and 2016. The instruments and outcome measures used to report post-low anterior resection bowel function were extracted and their frequency of use calculated.

Results: The search revealed 128 eligible studies. These employed 18 instruments, over 30 symptoms, and follow-up time periods from 4 weeks to 14.6 years. The most frequent follow up period was 12 months (48%). The most frequently reported outcomes were incontinence (97%), stool frequency (80%), urgency (67%), evacuation dysfunction (47%), gas-stool discrimination (34%), and a measure of quality of life (80%). Fecal incontinence scoring systems were used frequently. The LARS Score and the Bowel Function Instrument (BFI) were used in only 9 studies.

Conclusion: LARS is common, but there is substantial variation in the reporting of post-low anterior resection functional outcomes. Most studies have focused on incontinence, omitting other symptoms that contribute to patient quality of life. To improve and standardize research into LARS, a consensus definition should be developed, and these findings should inform this goal.

REVASCULARISATION IN ACUTE MESENTERIC ISCHAEMIA: A SYSTEMATIC REVIEW OF PROGNOSTIC FACTORS FOR MORTALITY

Catherine Dost, Cindy Wang and Sarah Attkin

Concord Institute of Academic Surgery, Concord Hospital

Introduction: Mesenteric vascular occlusion carries a poor prognosis. There is no consensus around the role of arterial revascularisation or preoperative factors predicting survival in acute mesenteric ischaemia (AMI). Further variability amongst the prognostic factors measured in studies may limit the application of these findings. The aim of this review was to evaluate the role of multi-factorial analysis and identify the major contributing factors associated with survival in AMI.

Methods: Systematic searches were performed in Medline, Embase and Cochrane for studies investigating mortality in patients with AMI, reporting at least one independent risk factor. Data were extracted and their frequency of use calculated. Meta-analysis was performed where study population and factor measurement were sufficiently similar to allow collation.

Results: Seven cohort studies were included (1 prospective, 6 retrospective). Mortality at 30 days or in the preoperative period ranged between 22%–47%. Eleven positive prognostic factors were identified. There was significant variability across all studies with high risk of confounding bias.

Conclusion: Most prognostic factors were examined in only one study or demonstrated conflicting significance. Meta-analysis showed increasing age was a significant prognostic factor for mortality (OR1.06, 95%CI 1.02-1.09 P < .001). In two studies, endovascular therapy conferred survival benefit over open revascularization.

EUS-FNA DIAGNOSTIC ACCURACY IN SUSPICIOUS PANCREATIC MASS: A SYSTEMATIC REVIEW AND META-ANALYSIS WITH PRELIMINARY RESULTS

Winy Widiay, Daniel Yang and Vincent Lam

Department of Hepatobiliary and Gastrointestinal Surgery, Westmead Hospital

Introduction: Recent literature shows promising results in the use of endoscopic ultrasound-guided fine needle aspiration (EUS-FNA) in aiding diagnosis of pancreatic cancer. The aim of the study is to systematically review the diagnostic value of EUS-FNA in patients who presents with clinical and/or radiological suspicion of pancreatic cancer.

Methods: A systematic literature search was performed in Medline, Embase and Cochrane Library from 1946 to Aug 2016. Studies were selected according to inclusion and exclusion set prior; the reference of standard was either surgical histopathology or clinical follow up of at least more than 6 months. Studies which examined core biopsy were excluded. Data collected was used to construct 2 by 2 table. Statistical analysis of data is used to calculate pooled value for sensitivity and specificity of EUS-FNA.

Results: A total of 20 studies were identified between 1996 to 2015 and a total of 3604 patients were included in the analysis. Ten studies were prospective and 10 studies were retrospective. The pooled sensitivity of EUS-FNA in the diagnosis of pancreatic cancer is 0.92 (95% CI: 0.91-0.93) and the specificity is 0.96 (95%CI: 0.94-0.98). The positive likelihood ratio is 29.74 (95%CI: 17.76-49.81) and the negative likelihood ratio is 0.07 (95%CI:0.06-0.90). The diagnostic accuracy of EUS-FNA is 93%. The median follow up is 14 months. In these studies, no major associated complications was reported and the minor complications was <1%. The median QUADAS score is 12. Preliminary sub-group analysis showed that there is significant difference of diagnostic accuracy in prospective versus retrospective studies is 91% versus 95%, p < 0.05. Further heterogeneity and sub-group analysis is pending.

Conclusion: EUS-FNA has shown to be a highly sensitive and specific test in the investigation of pancreatic mass. With further instrumental advancement future research should also evaluate the potential efficacy of EUS-FNB on diagnosis accuracy.

CITED EVIDENCE OF ABNORMAL INTRA-COLONIC PRESSURE PROFILES IN DIVERTICULAR DISEASE – A SYSTEMATIC REVIEW AND META-ANALYSIS

Rebekah Jaung1, Jason Robertson2, Greg O’Grady1, Tania Milne1, David Rowbotham1 and Ian Bissetti1,3

1Department of Surgery, The University of Auckland; 2Department of Gastroenterology & Hepatology, Auckland City Hospital; 3Department of Surgery, Auckland City Hospital, New Zealand

Introduction: Abnormal colonic pressure profiles and high intraluminal pressure profiles are postulated to contribute to the formation of sigmoid colon diverticulosis and pathophysiology of diverticular disease (DD). This study aimed to review evidence for abnormal colonic pressure profiles in diverticular disease.

Methods: All published studies investigating colonic pressure in patients with diverticulosis were searched in three databases (MEDLINE, EMBASE, SCOPUS). No language restrictions were applied. Any manometry studies in patients with diverticulosis were compared with controls were included. A meta-analysis was performed using Review Manager 5.3 for comparable outcomes.
Results: Ten studies (published 1962–2005) met inclusion criteria. The studies followed a wide variety of protocols and all used low-resolution manometry (sensor spacing range 7.5–15 cm). Six studies compared intra- and submucosal pressure, with 5/6 showing higher pressure in diverticulosis vs. controls, but only two reached statistical significance. Meta-analysis showed no difference in mean intra-submucosal pressures between the diverticulosis group and controls (standardised mean difference 1.88 [-0.16, 3.92]; 3 studies). Meta-analysis of duration of regular contractile activity also revealed no difference (2.20 [-1.03, 5.42]). The ‘motility index’ (mean amplitude x % activity duration) could be pooled as a weighted mean from three studies, and was higher with diverticulosis (183.8 vs 345.8).

Conclusion: This systematic review of manometry data shows that evidence for abnormal sigmoid colon pressure in diverticulosis currently is weak. Existing studies utilised inconsistent methodology, showed heterogeneous results, and are of limited quality. Higher quality studies using modern manometric techniques are needed to clarify the role of colonic pressure in diverticulosis and DD.

ANTERIOR RESECTION SYNDROME – SHOULD WE BE TELLING OUR PATIENTS TO EXPECT MORE?

DANETTE B. WRIGHT, KHEING-SEONG NG, AND MARC A. GLADMAN
Academic Colorectal Unit, Sydney Medical School, University of Sydney

Introduction: Anterior resection syndrome (ARS) is the collection of poorly defined symptoms of bowel dysfunction that frequently occur following anterior resection of the rectum. Currently, surgeons counsel patients that these symptoms ultimately resolve with time. The aim of this study was to comprehensively evaluate long-term bowel function following anterior resection.

Methods: A self-administered questionnaire was completed by consecutive patients who had undergone anterior resection between 2002–2012 and had participated in an earlier study. The questionnaire included subjective and objective measures of post-operative bowel function, assessing long-term satisfaction with bowel function and severity of rectal storage and evacuation function.

Results: Of the 279 eligible patients, 206 (mean age 71 yrs) participated (74%). The mean duration of follow-up was 7.8 (2.5) years. Approximately one-quarter (24.8%) had an ultra-low anastomosis (1–5 cm), 27.2% a low anastomosis (6–10 cm) and 48.5% were 11-15 cm from the anal verge. Overall, patients experienced a mean of 5.7 symptoms of evacuation (ED) or storage (SD) dysfunction. Concomitant ED and SD was present in 1/3, ED only in 27% and SD only in 8.7% with the remaining 13.6% being asymptomatic. The mean Cleveland Clinic Constipation Score (Wexner) was 5.3/30. Wexner scores were greater in those with >10 yrs of follow-up compared to <5 yrs and 5–10 yrs (P = 0.026). The mean Vazey Incontinence Score was 4.8/24. For each additional symptom of SD or ED experienced, the odds of being satisfied with long-term bowel function was significantly reduced by 25% (OR 0.74, 95% CI 0.66-0.83) and was independent of patient age at follow-up. The number of SD or ED symptoms did not differ between patients followed-up for <5, 5–10 or >10 yrs. Overall, one-quarter (24.7%) were dissatisfied with their long-term bowel function, although multivariate analyses did not identify any factors associated with long-term satisfaction.

Conclusions: Bowel dysfunction is prevalent and persistent in the long-term following anterior resection and includes symptoms of both storage and evacuation dysfunction. Evacuation (± storage) dysfunction is more prevalent on long-term follow-up but is omitted from existing Anterior Resection Syndrome scoring systems. Importantly, patients should be counselled that bowel dysfunction is persistent (and possibly permanent) postoperatively.

FAECAL INCONTINENCE: KNOWLEDGE, SKILLS AND BARRIERS TO SPECIALIST REFERRAL AMONGST AUSTRALIAN PRIMARY HEALTHCARE PROVIDERS

DEANNE S. SOARES, SREESHIA KONERU, KHEING SEONG NG AND MARC A. GLADMAN
Academic Colorectal Unit, Sydney Medical School, University of Sydney, NSW

Introduction: With a staggering prevalence of 8-13% in the community, faecal incontinence (FI) constitutes a substantial health and economic burden. Recent advances mean that patients no longer need to suffer from this debilitating disorder. However, access to specialist services and treatment is dependent on timely referral by primary healthcare providers. Therefore, the aim of this study was to evaluate the current knowledge, skills and barriers to specialist referral of patients with FI by healthcare practitioners in Australia.

Methods: A prospective, nationwide, cross-sectional study of primary healthcare providers including GPs, nurses and physiotherapists, attending a health education seminar was performed using a self-administered questionnaire.

Results: 1276 of 2857 delegates (44.7%) participated, consisting mostly of GPs (n = 878;74.8%), with the remainder comprising nurses (n = 139;11.8%) and midwives (n = 130;11.1%). Participants were predominately female (n = 867.83%) & practiced mostly in metropolitan areas (n = 635.63%).

The prevalence of FI amongst primary healthcare seekers was accurately estimated by only 236 participants (19%). Most (n = 939;74%) reported that they would refer incontinent patients to a surgeon for further investigation and treatment, with the vast majority choosing one based on the recommendation of a colleague (n = 573.47%).

1150 participants (90%) judged their prior training and education in the management of FI to be ‘minimal’ or ‘absent’, with the vast majority (n = 1137; 91%) reporting a desire to receive further education. The majority reported their overall knowledge (n = 882.70%) & current skills in the screening (n = 821.65%) & management (n = 852.68%) of FI as poor/very poor. The most common barrier to the screening &/or treatment of FI was their own personal lack of skills in managing this condition & knowing where (n = 912; 73%) and whom (n = 1042; 84%) to refer patients would help facilitate patient management.

Conclusions: There are barriers to the effective assessment & treatment of patients with FI in primary care & appropriate referral to specialist services, which predominantly reflects lack of confidence on account of suboptimal education/training of primary healthcare providers. Given the appetite for further knowledge, specialists have an important role to play in engaging & supporting primary healthcare colleagues to improve patient care.

PROGNOSTIC FACTORS INFLUENCING DISCHARGE FROM HOSPITAL AFTER MAJOR VASCULAR SURGERY

SARAH ATIKEN, DEBORAH RANDALL, FIONA BLYTH AND VASIKARAN NAGANATHAN
Institute of Academic Surgery, Concord Repatriation General Hospital, University of Sydney

Introduction: Vascular surgery is high risk and adverse discharge outcomes are common. This study uses data-linkage to identify prognostic factors that influence discharge outcomes after discharge after vascular surgery and inform the development of evidence-based, multidisciplinary discharge planning pathways.

Methods: Electronic medical records of patients undergoing major vascular surgery were identified from the statewide government administrative database including the admission records of all patients who had vascular surgery in NSW from 2010–2012. Major vascular surgery was defined as carotid, aortoiliac and peripheral arterial surgery as well as major amputation. Mortality and hospital stay duration were key outcomes in the study.

Results: 11,966 patients had a major vascular operation during the study period (13,584 procedures). The median age at time of first surgery was 73 years old (range 18–102 years) and 30% (n = 3565) of patients were female. The majority of procedures were performed in public hospitals (n = 8461, 71%) with a third of patients requiring emergency surgery (n = 3667, 31%). Mean length of hospital stay was 4.5 days. 30% of patients required intensive care (ICU) after vascular surgery. Mean survival was 233 days after surgery. 30% of patients required nursing home placement within three years of major vascular surgery. Multivariate analyses showed aged >80 years (HR 1.6, P < .0001), increased comorbidities (HR 3.2, P = .0001), emergency surgery (HR 2.4, P < .0001), residence in a nursing home prior to hospital admission (HR 7.4, P<.002), transfer from other hospital (HR 2.02, P = .002), and >5 days in ICU (HR 2.3, P = .002) were all associated with lower overall survival. Increasing age was not a significant prognostic factor for prolonged hospital admissions (>10 days) but emergency hospital admission and prolonged ICU admission...
were predictive. Discharge to a nursing home was predicted by increasing age and comorbidity.

Conclusions: Patients with advanced age, preoperative nursing home residence and increased comorbidities independently have a higher rate of adverse discharge outcomes after major vascular surgery. Knowledge of these prognostic factors can assist in identification of patients at high risk of adverse discharge outcomes and aid with early discharge planning and patient-centred clinical decision-making.

A NOVEL METHOD OF ANALYZING AND INITIATING A TARGETED INTERVENTION FOR POPULATIONS AT RISK OF LATE-STAGE BREAST CANCER

PILU BAYABAL, DAVID GOLDSMAN, ELEANOR BRUCE, AND SANJAY WARRER

1Department of Surgery, Royal Prince Alfred Hospital; 2University of Sydney, Camperdown; 3Geocoastal Research Group, School of Geosciences, Madsen Building F09, University of Sydney, NSW 2006, Australia

Introduction: A myriad of risk factors have been established for breast cancer. Prevention among at-risk women remains an area where significant gains can be achieved. At a local level, the success of interventions aimed at breast cancer prevention have been challenged by their ability to successfully adapt to the risk profile of an area. 7% of premature deaths from breast cancer are purely from spatial inequality. Socioeconomic factors, especially disadvantage, have been shown to play an important role in the differential distribution of the disease.

This study aims to improve rates of cancer screening and outcomes by identifying sub-groups in a local health district that have increased risk of presenting with late-stage breast cancer (LSBC).

Methods: All patients presenting to the Royal Prince Alfred Hospital (RPAH) between July 2005-March 2013 were identified. For each patient, data was collected on: sociodemographics (including country-of-birth), geographical area of residence, socioeconomic characteristics of residential area and the clinical features and outcomes of the cancer. The data were analysed to identify sub-groups at greatest risk of presenting with LSBC. Geospatial analyses were conducted to ascertain if LSBC clustered in geographical areas or was associated with area-level socioeconomic characteristics captured by the SEIFA(socioeconomic-indexes-for-areas) index.

Results: A total of 5317 patients presented with LSBC over the study period. They were mapped over 49 contiguous regions. Most (47.54%; n = 2536) were Australian-born, followed by Southern/Eastern Europe (12.80%; n = 683) and North-East Asia (8.61%; n = 459). Among patients presenting with LSBC, most (50.11%; n = 1151) were Australian-born, followed by Southern/Eastern Europe (11.84%; n = 683). LBSC was associated with area-level socioeconomic disadvantage within some postcodes. Patients residing in the northeastern and western regions of the health district had a greater likelihood of presenting with LSBC (relative-risk of 1.51-2.25). These areas were also characterized by socioeconomic disadvantage when correlated with the SEIFA index.

Conclusions: SHLD residents in socioeconomically-deprived areas, who are of Australian or Eastern/Southern European descent were more likely to present with LSBC. Focused interventions targeting this cohort are required. Further exploratory analyses should be conducted to test associations across other hospital catchment zones.

ROLE OF STEREOTACTIC BODY RADIOTHERAPY IN UNRESECTABLE AND UNTRANSPLANTABLE HEPATOCELLULAR CARCINOMA: A SYSTEMATIC REVIEW

GEORGE CHEN, SEAD AHMADZADA, YASSER FAROOQUL, JANE-LOUISE SINCLAIR, ARTHUR RICHARDSON, HENRY PLEASS AND VINCENT LAM

Westmead Hospital Upper GI Department

Hepatocellular Carcinoma (HCC) accounts of 80-90% of primary liver cancers. Surgical resection and transplantation are curative options but less than 30% of patients are deemed suitable. A systematic review was undertaken to assess the efficacy of Stereotactic Body Radiotherapy (SBRT) as an emerging treatment modality for unresectable and untransplantable HCC.

An electronic search of Medline and Embase was conducted. Retrospective, prospective and non-randomized trials were identified. There was no randomized controlled trials. Eligible studies were selected using a predetermined criteria with relevant data extracted by two independent reviewers.

Thirty-six studies were included in this review with a total of 1874 patients undergoing SBRT. These patients were ineligible or had failed previous surgical resection, transplantation, chemoembolisation and ablative therapies. Most patients had Child-Pugh classification A or B. Median tumour diameter was 3 cm (range 1.6-11.36 cm). Median local control, defined as ≤20% progression of contrast enhancement in the tumour on arte- rial phase, was 95.5% (range 57.9-100%). The median overall survival at 1-year and 2-years was 78.5% (range 50-100%) and 61.4% (range 45.3-87%) respectively. The mean rate of classic and non-classic Radiation-Induced Liver Disease (RILD) was ≤5% with several studies reporting nil cases. No SBRT related mortality was reported in any of the studies.

SBRT appears to be an effective and well-tolerated treatment modality for HCC, conferring benefits in local control and survival in select patients. However, further studies are required to validate these promising results.

QUALITATIVE ASSESSMENT OF A PILOT INTEGRATED ULTRASOUND SKILLS COURSE FOR JUNIOR MEDICAL OFFICERS

CINDY WANG, PETER CELLICH, LEWIS CHEN, ROBERT ROSSO AND SARAH AITKEN

Concord Institute of Academic Surgery

Background: Point-of-care ultrasonography (PCU) is increasingly accessible as an essential non-invasive investigation in surgical practice. We developed a short integrated ultrasound skills course in response to professional bodies highlighting PCU as standard of care. The course used a blended learning approach, based upon adult learning theory and aimed to improve patient safety through the combination of didactic learning and practical workshops, integrated into the pre-existing junior medical officer (JMO) curriculum. Basic ultrasound physics and interpretation were taught with lectures and prescribed reading, whilst five practical workshops demonstrated ultrasound scanning skills and intervention. The longitudinal nature of the curriculum was designed to improve knowledge retention. The hands-on practical sessions included both live and low-fidelity simulation models, which have been shown to be equally as effective in studies of simulation based learning. This study presents a qualitative analysis of the education experiences of the JMOs undertaking the integrated ultrasound course.

Method: Based on extensive literature review, the Integrated Ultrasound Skills Course was developed. This was conducted in a tertiary public teaching hospital over a period of ten weeks with five interactive teaching ses- sions. Junior medical officers learning experiences were evaluated using a validated questionnaire. Course attendance was recorded. Participant experi-ences were qualitatively assessed via a focus group.

Results: Twenty-four JMOs expressed interest and eleven were selected to participate. Attendance was 80% or more for all five sessions. All JMOs completed the evaluation questionnaire and attended the focus group. All students agreed that the tutor to student ratio (1:4) was adequate for learning needs. All agreed that examples and practical sessions provided in the course aided understanding. The majority (91%) reported that low-fidelity simulators were helpful in their learning and that the course improved their clinical practices.

Conclusion: Consistent with current literature, the junior medical offi- cers benefited from a longitudinal, blended learning approach with a low tutor to student ratio and the use of simulation models. With increasing availability of ultrasonography, PCU is a developing adjunct tool for bedside examination.

HAEMORRHAGIC AND THROMBOEMBOLIC COMPLICATIONS IN PATIENTS FOLLOWING MAJOR COLORECTAL SURGERY: INCIDENCE, OUTCOMES, AND RISK FACTORS

REBECCA CUI, KHEING-SEONG NG AND CHRISTOPHER YOUNG

1Department of Colorectal Surgery, Royal Prince Alfred Hospital; 2University of Sydney, NSW, Australia

Introduction: Post-operative thromboembolism and haemorrhage (POTH) are recognised complications following colorectal surgery. Adding to the quandary are patients requiring perioperative antplatelet/
anticoagulant therapy (pAPAC) for various co-morbidities. The exact burden of POTH following colorectal surgery, however, remains poorly described. This study aimed to investigate the incidence, outcomes, and risk factors for POTH following major colorectal surgery.

Methods: A retrospective cross-sectional study of patients undergoing major colorectal surgery at a tertiary centre in Sydney, Australia, over a 2 year period (2010, 2015) was performed. Major colorectal surgeries included large bowel resection (+/- anastomosis), stoma formation/reversal, and associated hernia repairs. Records were comprehensively reviewed to collect data of patient demographics, clinico-pathological characteristics of surgery, and co-morbidities (including pAPAC use). Outcome measures included incidence of POTH with focus on Clavien-Dindo grade, 30-day readmission, return to theatre, and mortality.

Results: Overall, 812 patients underwent major colorectal surgery (426 M, mean 60.7 yrs [SD16.7]). Common diagnoses included cancer (41%), post-surgical herniae (10.3%) and bowel obstruction (8.1%). Surgeries included anterior resection (20.7%), right hemicolectomy (17.2%), and stoma reversal (13.8%), with 67% ‘open’ and 74% elective procedures. A quarter of patients were on pAPAC (aspirin 15.3%, warfarin 5.2%, clopidogrel 4.1%). 74 (9.7%) of patients had POTH complications (haemorrhage 6.8%, DVT 2%, PE 0.6%). Most were graded Clavien 1/2, with only 9 patients (1.1%) requiring readmission, 7 (0.9%) with return to theatre, and 4 (0.5%) mortalities.

On univariate analysis, POTH was associated with pAPAC (OR 2.66, 95%CI 1.62-4.36) and age (mean 66.8 years vs 60.3, p < 0.01). Rates of POTH were lowest in those undergoing hernia repair (1.3%) (p = 0.04). Emergency surgeries tended to have higher rates of POTH (13.4% vs 8.6%, p = 0.06). On multivariate analysis, only pAPAC (aOR 2.20, 95%CI 1.28-3.78) and age (aOR 1.02, 95%CI 1.00-1.04) remained significant factors.

Conclusion: POTH complications affect 1 in 10 patients after major colorectal surgery. pAPAC and age are the most significantly associated factors; this may have implications in a progressively ageing and co-morbid surgical population. The exact burden of such complications remains unclear, with few requiring readmission or return to theatre.

DO STUDENT SOCIETIES HAVE AN IMPACT ON EDUCATION AND LEARNING FOR UNIVERSITY STUDENTS?

PATRICIA DUONG, MARCUS HOVENS, MICHAEL ROBERTS, ARIEL WOO, DILUM EKANAYAKE AND JAMES FRASER

The University of Queensland, School of Medicine

Introduction: Student groups focused on improving education based at educational institutes provide an environment for students to expand on their knowledge, interests and career goals alongside colleagues. Extra-curricular educational institutes provide an environment for students to expand on their educational, social, democratic achievements and personal growth but the impact on education and their academic component or increased social effects on a students educational and learning is impacted by peer influences in the form of student societies.

Methods: A systematic review evaluating qualitative and quantitative results of student societies’ influence on academia was performed. Our electronic search strategy queried the following online educational research databases: Medline, Proquest and PubMed. The inclusion criteria were developed to incorporate subjects that were students enrolled at a tertiary level education institute and student societies that had an academic focus based on the surgical student interest group model. Papers that evaluated student led initiatives such as group workshops, seminars and conferences were also included. Exclusion criteria were social groups or sporting teams and papers not written in English. Narrative synthesis was applied in this review. Of the papers that met the inclusion criteria, the Cochrane Risk Assessment Bias tool was used for screening. The articles were appraised independently by four authors for extraction of methodological quality.

Results: A total of 15 studies of mixed methodology were identified for review. All studies identified a beneficial academic component or increased interest in career aspirations influenced by student societies. Improved learning outcomes, enhanced student performance were key findings and early mentorship played an important role in influencing students’ career aspirations.

Conclusions: Academic challenges faced by students can be alleviated by student societies that focus on enhancing education and learning. Many peer-led approaches benefit students by improving their skills and thusly their confidence towards their subjects or career aspirations.

DELAYED DIAGNOSIS IN ANORECTAL MALFORMATIONS: INCIDENCE AND POTENTIAL FOR COMPLICATIONS

PAUL KUEGER, WARWICK TEAGUE, VICTORIA LANE, RICHARD WOOD, MARC LIVITT, JOHN HUTSON AND SEBASTIAN KING

Department of Paediatric Surgery, The Royal Children’s Hospital, Melbourne, Australia; Department of Colorectal Surgery, Nationwide Children’s Hospital, Columbus, Ohio, USA

Introduction: Anorectal malformations (ARM) are common congenital abnormalities of the terminal hindgut. Ideally, ARM should be diagnosed at, or shortly following, birth by careful physical examination of the perineum. Delayed diagnosis has been implicated as a risk factor for complications, including intestinal perforation. This study aimed to determine the rate and complications of delayed diagnosis in ARM.

Methods: A retrospective review was performed of all ARM patients managed at a tertiary centre over a 15 year period (2000–2014). Data collected included ARM type and timing of diagnosis. Consistent with literature, ‘delayed diagnosis’ was defined as being at more than 24 hours of age.

Results: A total of 243 ARM patients (male = 146/243, 60%) were included. The most frequent ARM types were perineal fistulae (83/243, 34%) and rectovesical fistula (40/243, 16%). Diagnosis was delayed beyond 24 hours of age in 93/243 (38%) patients. The ARM type most commonly delayed in diagnosis was anal stenosis (17/25, 68%). Two patients in whom diagnosis was delayed suffered an intestinal perforation, one of whom subsequently died.

Conclusions: Delayed diagnosis in ARM patients remains a common, and potentially fatal, occurrence. Improved assessment of newborns is required to ensure timely diagnosis of ARM, and avoidance of complications associated with delayed diagnosis.

ANTERIOR RESECTION SYNDROME - DOES TIME HEAL ALL WOUNDS?

DANETTE WRIGHT, KHEONG-SEONG NG AND MARC A. GLADMAN

Academic Colorectal Unit, Sydney Medical School, University of Sydney, NSW

Introduction: Anterior resection syndrome (ARS), is a symptom-complex of bowel dysfunction that is recognised as a frequent clinical problem following anterior resection of the rectum. However, its natural history is not well understood. The aim of this study was to perform comprehensive longitudinal evaluation of bowel function following anterior resection.

Methods: A longitudinal study was performed on consecutive patients who underwent anterior resection between 2002–2012. Detailed symptom and Low Anterior Resection Syndrome (LARS) evaluation was completed in 2012 and 2015. The study outcomes were: objective assessment of evacuation and storage functions of the rectum; and subjective satisfaction with bowel function.

Results: Of the 476 eligible patients, 338 (71%) participated in 2012 and 206 (61.9%) patients in 2015. Satisfaction with bowel habit did not change significantly between the time points (P = 0.860) with 24.7% of patients remaining dissatisfied. Overall, 26.3% of patients demonstrated deterioration in satisfaction scores and were around half as likely to have had a defunctioning ileostomy (adjusted OR 0.45 95% CI 0.22 – 0.98) compared to those who reported no change in satisfaction. The mean Cleveland Clinic Constipation Score (Wexner) was 5.3/30 at follow-up and did not change between time points (P = 0.304). By contrast, the mean Vaizey Incontinence Score was 4.8/24, which decreased significantly between 2012 and 2015 (~1.4, P < 0.001), reflecting improved continence. Similarly, the mean LARS score was 15.7 and also decreased (~2.8, P < 0.001), although the proportion of patients meeting criteria for LARS was the same (P = 1.000). The mean number of evacuation (ED) and storage dysfunction (SD) symptoms was 5.7 which remained unchanged (P = 0.880). Of ED symptoms, only a sensation of anal obstruction occurred less frequently (30.0 vs 21.8%, P = 0.038). Of SD symptoms, faecal urgency occurred more frequently (42.2-56.8%, P < 0.001). The proportions with SD and ED (51%), SD alone (8.7%) and ED alone (26.7%) remained unchanged.
Conclusions: Patient dissatisfaction with bowel function is persistent on longitudinal follow-up post anterior resection. Clinical symptoms include both evacuation and storage dysfunction, although improvement in the latter occurs with time with improvement in incontinence severity scores. Strategies to improve symptoms and satisfaction are required in cohort patients with ARS.

STUDENT-LED SURGICAL TEACHING; A COHORT STUDY

Dilum Ekanayake, Paul Lim, Michael Roberts, Christopher McKenna, Marcus Hovens and James Fraser

The University of Queensland, School of Medicine

Introduction: A recently observed decline in medical student interest in pursuing surgical careers has become a cause for concern. Especially worrying is that the Australian surgical workforce will require expansion to meet the projected rise of an aging population. Waning interest has been especially noted to occur as students progress through their medical degrees. Upskilling students so that they may take advantage of clinical opportunities may work to improve intention to pursue careers in surgery in the future.

Student surgical interest groups are ideally placed to increase the level of basic surgical skills and surgical interest amongst the student population. We aimed to determine how surgical skills workshops, organised by a surgical interest group, could influence student learning and retention by measuring pre and post workshop skills and knowledge. Satisfaction with the workshop was also queried. It is predicted that attendees will show significant improvements in knowledge which is then retained in the longer term.

Methods: To quantify attendee learning, retention, and satisfaction, a prospective cohort study design was used. Three identical tests were designed and validated by senior clinicians. These knowledge-based tests were administered at three junctures; immediately before, after and 4 weeks following the workshop. Two additional surveys to assess participant and tutor satisfaction was administered at the conclusion of each workshop.

Results: Preliminary data showed an average improvement in knowledge of 36.67% from pre workshop to the retention test, while the average knowledge retention rate of students from post-workshop to retention was high (>95%). Satisfaction rates were high overall for both tutors and students, with students finding the session informative and enjoyable. Students further reported a better understanding of underlying surgical skills, theory and increased confidence in performing basic surgical procedures.

Conclusions: Student surgical interest societies are effective in providing educational workshops. Significant improvements in student knowledge and skill can be seen. A standardised teaching tool will be developed and disseminated aiming to improve the capacity of student groups to run effective surgical teaching workshops.